

THE AMERICAN X-RAY JOURNAL

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY

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SUBSCRIPTION RATES—IN ADVANCE.

United States, Canada and Mexico.....	\$3.00		Foreign Countries.....	\$4.00
Single Copies.....	25		Single Copies.....	35

Editorial matter should be addressed to Dr. Charles P. Renner, Editor, Suite 301 Chemical Bldg., St. Louis.

All business matter should be addressed to the American X-Ray Journal Publishing Co., same address.

All contributors of original articles and other matter relative to X-Radiance, of interest to the medical profession, are solicited from all parts of the world. Contributors will be furnished a liberal number of extra copies of the JOURNAL containing their articles.

Translation of articles written in German, French and Spanish is made by Frank Ring, M. D., 611 Chemical Building, St. Louis, Mo.

Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter.

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ST. LOUIS, JUNE, 1902.

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This radiograph is a section of one described in this number of the Journal, under the caption, "History of a Case of Unrecognized Fracture of the Radius," by Dr. Paul F. Fletcher. The arm, forearm and hand were taken in one plate, but the section that revealed injury was all that we had electrotyped. The offending spicula of bone is clearly seen. The radiograph was made in the x-ray laboratory of Dr. Robarts.

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The Practical X-Ray Diagnosis.

Prepared by J. Rudis-Jicinsky, A. M., M. D., M. E.
Cedar Rapids, Ia. Revised by M. U. Dr.
Joseph Hoffman, Vienna Austria.

A series of A B C teaching for workers in x-ray diagnosis and therapeutics, to be concluded in 20 articles. Fully illustrated.

CROOKE'S TUBES.

LESSON IV.

The Crookes' tubes or the Vacuum tubes which are used to generate the x-rays, are so named after Sir William Crookes, F. R. S., who constructed them for his famous experiments in radiant matter. In these tubes the air has been exhausted to such a degree that the remaining particles have a vastly greater freedom of movement than when under usual atmospheric pressure.

Under these circumstances, on leading a powerful electric force into the tube by means of its sealed-in electrodes, these air particles are thrust to and fro between the electrodes and the glass opposite, just as an electric machine causes pith balls to dance, and by their incessant bombardment cause heat to appear in both metal and glass. The tube is the most essential part of an x-ray outfit, and must be of good efficiency. The efficiency of the tube greatly depends upon the focus tubes, containing a platinum re-upon the spark length, the volume of

the same and the proper technique. But the most important discovery, how to keep the character of the light more constant and complete, has to be made yet. If we work in the beginning with diminished tension and gradually increasing the same by means of the current regulator of our apparatus, the life of the tube will be considerably prolonged.

The interior action of an x-ray tube may be regulated. What the x-rays are themselves we are not yet able to say. What changes occur in the tube from the standpoint of a physicist we do not know positively; some say it is the disassociation of vapor molecules of water, others think that there is some breaking up of hydrogen atoms, and finally, the theory of corpuscles was given for the whole phenomena in the tube during the raying. We, however, do know how to get and reproduce some certain results of x-ray work; results giving us different degrees of x-rays with different degrees of shadows in our pictures. The rays we observe with the fluoroscope, the penetration and the shadows may be differentiated with a skiameter and to become a master observer of these rays, should be our aim.

These tubes are made in various shapes. Globular, Pear-shaped and Cylindrical, so-called on account of the peculiar constructions of the electrodes. The best tubes yet made are the so-called

flector (Monell's etc.), as shown in Fig. 2, with or without the regulating device for increasing or decreasing the vacuum in the tube, or they may be reinforced

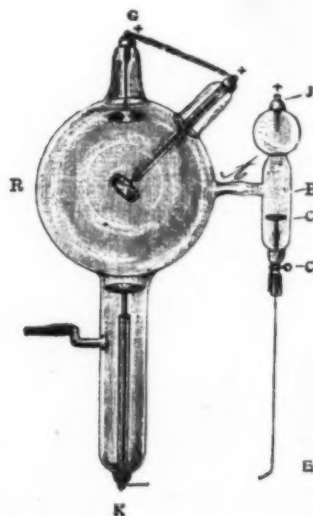


Fig. 2.

on platinum plate with platinum (Green and Bauer). The concave electrode is always used as the cathode. The cathode rays, proceeding from it, focus on the platinum sheet, which forms the anode with or without a disk reflector, rotary target, cooled target (Rollins), or continuous metallic conductor with or without the cup (See: Amer. X-Ray Journal, July, 1899), sending off from the spot on which they focus a powerful shaft of x-rays. As this spot is quite small, skiagraphs, or radiographs made with this or similar tubes are always well defined, and may now be made especially with the help of intensifying screens in a much shorter time than would have been considered possible at

an earlier period of the photography of the invisible. Fig. 3 represents Thompson's double focus tube, having two cathode electrodes, the rays from which are projected simultaneously against the V-shaped anode placed between them. (Not shown.)

Leonard's double focus tube is constructed in such a way that a proper localization without any other device is not only possible, but sure and simple. (See: Amer. X-Ray Journal, Nov. 1899.) There are tubes in the market supplied with additional chamber containing volatile salts or wires, the heating of which reduces the vacuum of the tube, and thus a more uniform vacuum can be obtained or the vacuum itself may be regulated. Muller's Universal Roentgen Tube



etc.) Müller's Universal Röntgen Tube with auxiliary tube for regulating the vacuum to either a high or low degree is the latest. The advantages of this regulating *modus operandi* comprise the following:

1. That the use of a flame is entirely obrogated and,
2. That the regulating device can be used in the simplest and most effective

manner as an automatic regulator while the application is proceeding, and

3. That by reason of the addition of the auxiliary tube it recommends itself specially for long exposures as well as for exact impressions.

4. Most important of all advantages is the fact that the regulating elements contained in the auxiliary tube are so plentifully present that the longevity of the tube is thereby secured and with careful use should last for a long time.

Fig. 5 represents the tube, which was devised by Edison. Two slanting disks mutually converge the cathodic stream to the area of the glass bulb, at certain angle. With such a tube the over-heating is impossible. (Not shown.)

If we use the high potential and high frequency current another ingenious tube devised by Tesla may be employed. Fig. 6 shows the tube, which needs only



Fig. 6.

one terminal, but can not be used without the powerful Tesla coil.

There is another tube for stereoptic vision designed by Caldwell. By using two sources of x-rays in the same tube each eye views independently the shadow, with the result that the picture stands out distinctly. It is thought that the fluoroscopic examination of fractures especially may be made much more successfully, permitting immediate examination by this method with a fluoroscope having a special rotating shutter.

Reduction of Vacuum.

When the vacuum has become too high in consequence of much use, certain focus tubes had to be heated with a spirit lamp around the cathode or aluminium electrode until they again emit x-rays. This must not be done

while the current is passing through the tube, the operator may receive shocks from the apparatus, or the lamp could explode. If the degree of exhaustion of vacuum in the common focus tube or the New Improved German tube is too high, sparks will often play around the tube; to avoid this we use a round metallic disk at the anode (See Fig. 7), and

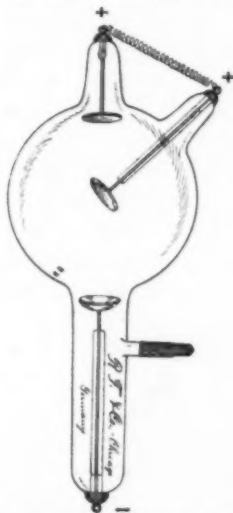


Fig. 7. Disk at anode, not shown.

get a steady light, that, by proper adjustment, may be increased to a brilliant glow, thus affording of any degree of penetration.

A very simple way to get a vacuum suited to our apparatus is by a hand regulator or a temporary regulator may be made by twisting a bit of wire on a stick. This way we may always cause several sparks to pass into the chemical bulb, place the regulator or short circuiting rod in contact with the platinum loop at the anode and cause the spark to pass to the cathode end of the tube. A very few sparks, sometimes one or two, should lower the vacuum sufficiently for the time being.

In discussing the problem of the proper manipulation of the vacuum of a tube to get good results and good

effects, we have to consider also the raising of the vacuum electrically in case of necessity. As stated already, the vacuum of a tube is constantly changing and the quantity differs occasionally and can never be relied upon to remain the same in every exposure. Our experience of observation with the help of the fluoroscope, therefore, is a better guide in each given case than all the theoretical advices given, lengths of exposures, etc. Sometimes few beautiful flashes of the x-ray, as seen on the screen of our fluoroscope, give us photographically better results than prolonged exposures made according to some given pattern. It is only necessary to become familiar with the stage of vacuum in our tube adopted for certain work, and to know how to produce it. We can expel gas from anode of our tube by introducing a variable capacity discharge in the anode end of the tube, and in this way or by simple burning, lower the vacuum, and by capacity discharge in cathode end and no discharge in anode, may raise the vacuum. So that by regulation of those two capacities, we can have the vacuum at a certain degree, and by varying the intensity of the current we can vary the quantity and the degree of our rays. The fluoroscope must always be our guide and if there is any blue color streaming along the inner walls of the tube, we know that we have only very weak rays, and it may require a longer stream of our current to produce the well-known green color of the x-ray proper. The x-rays have to have the necessary penetrating power, which easily may be made out on fluoroscopic examination, and the differentiation will follow, especially if we have a good apparatus possessing regulating mechanism of special construction.

To raise the vacuum electrically, therefore, we have to simply send a moderate

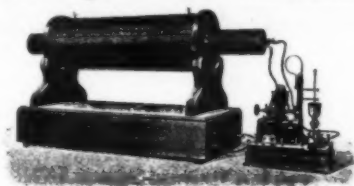
current through the tube continuously, the operator watching its behavior carefully for a little time, and as the fluoroscope indicates the different qualities of the rays, the observation may successfully be applied. (Rollins.)

We all know that the particles of gas in a Crookes' tube, and also those occluded in the terminals, become electrically charged and carry their charge from one terminal to the other when the tube is in action. The stream goes from the cathode to the anode. This movement of particles causes repulsion of unlike sign attraction, so that the particle being repelled from the cathode and attracted to the anode, strikes the latter with great force of the bombardment. This breaking up of the particles produces the x-ray; therefore, the more particles we have in action, the greater will be the quantity of rays. To have great contrast in our photographic work on our plates, we must have a good source of electricity, and a certain intensity of bombardment to each particle in our Crookes' tube; and to make short exposures, we must have a great quantity of rays, which we collect with the help of the calcium-tungstate screen, face down upon the film side of the sensitive plate. The vacuum of Crookes' tube is constantly changing quantity and should not be relied on to remain constant; it differs in different tubes and sometimes in one and the same tube. We therefore have always to watch our tube. To know our tube, the resistance of the same, and the proper technique is the whole secret of good results in radiology. The discovery of Roentgen, which makes possible and easy an absolutely correct diagnosis where previously uncertainty and error outweighed definite knowledge, through this results in experimentation and researches seems to be still more important.

LESSON V.

Induction Coils.

The induction coils used with x-ray apparatus are built on one and the same principle. The most practical point so far substantiated in the coil is that almost instantaneous skiagraphs can be obtained with not less than a 12-inch spark gap. Larger coils than this are not required for general use. The commonly



known Ruhmkorff Coil is used mostly, being named after Ruhmkorff, of Paris, who, although not the inventor of same, made many instruments of the kind, and contrived various improvements. There is no question about it that one of the most important factors in the production of the x-ray is a perfect working induction coil, as upon its action depends the satisfactory fluorescence of the vacuum tube. In the laboratory of an expert the coils are used, being very much more powerful, and as it is claimed giving effects which cannot be produced with a static machine. The coils are not affected by atmospheric changes and are in some instances portable. In my experience the coils gave us good results in skiagraphy, especially when the inducing currents were short, sharp, snappy and vigorous in connection with a good interrupter, but we like the work of a static machine just as well. In regard to the portability the coil certainly plays the main part and then is by far the most satisfactory to handle.

The induction coil consists of primary and a secondary winding of many miles

of wires and a case, which contains condenser or not. The primary coil and the condenser are provided with terminals for the connections. The primary coil is composed of a bundle of thin iron wires, around which a copper wire is wound. In coils giving 10 to 40-inch spark or over, the primary winding is entirely covered with an ebonite insulator, the inner coil is movable, so that it can easily be drawn out. This arrangement adds considerable to their efficiency and offers great security during transport. In introducing a quickly-interrupted current into the primary wire, currents of very high tension generated in the secondary wire and sparks of considerable length and volume are produced. The efficiency of an induction coil is greatly dependent upon the interrupter. (See the illustration in May issue of this Journal.)

When the coil is put in operation, a current regulator is interposed between the source of electricity, and the coil, in order to introduce into the latter the amount of current necessary for working tube. The speed of the interrupter must be also regulated until the most powerful results are obtained. A good coil has to maintain the full length of sparks even when the interrupter is working with great rapidity, and what is just as important, the spark has to be produced with every interruption. This is a very important point, as good results can only be obtained by interruptions of high speed. Remember that the value of an induction coil depends not only on the length of spark, but it is also necessary for the spark to be powerful and complete with every interruption, even when the interrupter is running at its greatest speed. Experience has shown a rapidity of 1,000 to 1,500 interruptions per minute to be the most useful both for skiagraphy and screen work. When

operating with higher speed, the tube will not always glow at every interruption and may act irregularly, not steady. The alternating current was not so effective as direct current when derived from the dynamo machine for our coil, and when batteries are used the main inconvenience in alternating the direction of the primary current is the use of a double break-wheel. Direct current in the primary circuit with proper interruption is the thing we are after. The kind of regulator, interrupter or vibrator or a break-wheel may be safely left with the manufacturer, who knows exactly what his coil properly needs.

When the apparatus is connected as per diagram (See: *Amer. X-Ray Journal*, Nov., 1899, page 663), it is ready for use and needs only the closing of the switch and possible slight adjustment of the contact screws to start the vibrator, interrupter, etc. When this is accomplished, the tube should become fluorescent. That is, if the tube has been so connected that the negative—or cathode current passes through the aluminum plate, which is in the tube, disk or any other device, the light which appears will be of a pale green color, and almost completely fill the space between the electrodes, while the x-ray may be instantly seen with the fluoroscope. If, however, the anode positive current passes into the tube through the aluminum electrode, the green light will be diffused part behind the platinum electrode and part of the lower edge of the bulge, while no light can be made out on the screen of the fluoroscope. In such a case, the wires which are connected to the tube should be reversed.

The Kinraide Induction coil was already mentioned; it consists of two separate secondaries with their primaries connected in series Fig. 9. The weak feature of the common Ruhmkorff coil

is the heat developed in primary, but in this coil insulation can not be melted and no delicate part of the apparatus will suffer by the heat generated. The Kin-

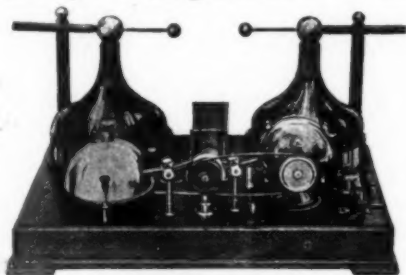


Fig. 9.

raide coil is portable, safe in operation, simple in construction, durable and may be operated with comparatively small amount of the current, giving strong x-ray light and great volume. The difficulty attending prolonged exposure does not exist, the skiagraphs will be very fine and finished negatives give full detail, and are as usually better than the positives.

There is another good coil to be mentioned and designated by Rollins. The vacuum in the tube with this apparatus may be regulated by moving rubber handles in front of the coil in and out. The contrast of light with tubes of different resistance may be observed very easily and with a Electrolytic-Interrupter the apparatus may be run for many hours daily. The coil may be operated from the direct or alternating current of 110 volts.

In case of any strikingly new development, the apparatus as first used is always a modified form of that already existing, but this gradually is abandoned and new types arise, which give more satisfaction or better results. The proof of this simple fact is also the Fessenden machine, which does not require delicate usage; is very simple, compact and portable. To start the machine all that is necessary, is to turn the switch and press

down the knob. There is no condenser, rheostat or other complicated apparatus, because all the adjustments are made by moving spark-gap handles. It is impossible for this coil to break down, because the insulation is different, even if deluged with water or acid. In such case you need only to remove the faulty section, and replace it with a new one, instead of requiring practically the rebuilding of the entire coil, as in the old method of construction. The volume of the spark in this coil is great and the energy of the secondary circuit may run up to 300 watts.

Observations on Broken Necks.

Dr. Reginald H. Sayre of New York presented a number of photographs from cases of fracture of the cervical vertebræ. In making the diagnosis the position of the head was of extreme importance; if the fracture involved the three upper vertebræ, the head would almost invariably be twisted to one side after the manner of torticollis, there was often also an abnormal straightness of the back of the neck. Dr. Sayre said experience had taught him that support of the cervical vertebræ was necessary for a much longer time than was generally supposed. Skiagraphs of these cases were often misleading, in very many cases an excellent mode of treatment was to envelope the body and head of the patient in plaster-of-Paris, so as to combine a helmet with a jacket.

These brief remarks on broken necks have one point of interest. "Skiagraphs of these cases are often misleading." All skiagraphs are misleading in the hands of the ignorant. Of course I mean the ignorant operator. This is like the old "inaccuracies of the x-rays" that haunted so many until the AMERI-

CAN X-RAY JOURNAL pointed out the sources of the inaccuracies. If in the instance of the subject the operator would use some device to correct the distortion his picture would have a known value. If he has knowledge of normal anatomy then his picture would show to him the condition exactly as it is and the abnormal state be properly interpreted.

A New Application of the X-Ray.

According to the *Journal de Medicine* a man placed under arrest for illegal practice of medicine, claiming to be a graduate of an American college, presented a diploma which excited suspicion. The Roentgen rays revealed the outlines of a named erased to make room for that of the man who was thus convicted.

The above is taken from an exchange and as there are no comments we are urged again to give our disapproval of the publication of any matter that gives evidence of falsity or smacks of quackery in x-rays. It is more difficult to unlearn than to learn correctly. False impressions only weaken the great importance of raying. Some months ago the AMERICAN X-RAY JOURNAL published quite fully the advantages the x-ray gave to those who were trying to identify the original signature upon paintings. It was valueless in every case except where the signature was made in gold. Modern ink with a fair amount of erasure will not be seen either on plate or screen.

The Royal College of Physicians and the Royal College of Surgeons together have sanctioned a plan for the systematic investigation of cancer. It is prepared to raise \$500,000 for the purpose.

(a) **X-Ray Narrative.**

A Series of Articles by Dr. F. S. O'Hara.

"It is remarkable what a part this machine can play in the destinies of mankind" said the gray-haired doctor as he leaned back in his chair and contemplated the trim outline of his static machine.

I surveyed the speaker with a quick and penetrative glance. It was late when I arrived in his office, but he had consulted with me regarding my ailment, advised me kindly what plan of treatment to follow, and now that our business had been finished we had turned to the discussion of the wonderful Roentgen Ray.

My analysis of Doctor Barsto was highly unsatisfactory. He was an enigma. That powerful build, agile movement, and immediate deduction from a line of reasoning, that he exhibited regarding my case, seemed more that of an expert detective than of a physician. And true it was that he had at one time been a great detective, but I am ahead of my story.

"To what particular destiny of man do you allude doctor?" I queried.

"Many, my dear sir, many and varied are the things in life intimately associated with the vital essence of life, electricity." What is it? You cannot see it, in its nascent state you cannot feel it, neither can you smell it nor yet can you taste it; yet it is that inexplicable something that rules this planet of ours, and if I am right in my theory it is that which holds the world of planets in position, and keeps chaos from supplanting cosmos. I call to mind a circumstance that if you have the time I shall take pleasure in relating to you, and which will show you one of the manifold uses to which a static machine can be put."

Assuring him that my time was in no

wise so valuable as was his, I settled myself to hear the tale he was about to relate.

"It was soon after the discovery of the ray was made by Prof. Roentgen, that I purchased a machine for experimental purposes, little thinking it to be of great value to me. I had learned the use of the various portions of the apparatus, and had succeeded in acquiring a lovely dermatitis during the course of my experiments, when I was consulted by a friend of mine, regarding a legal matter that engrossed his attention.

You are probably unaware that I was, many years ago, a dabbler in the science of criminology to the extent that I perhaps merited the title of detective. I would not mention this but for the fact that it has a bearing upon the case in discussion.

One evening, after I had my machine about three months, an old human blood hound friend of mine called to see me to ask some advice regarding a certain case that was puzzling him not a little.

The story, briefly told, was that Mrs. A—— had reported to the police the loss of a diamond necklace worth \$15,000.00. A servant of the household was suspected, a search warrant issued, and even the most minute investigation failed to reveal even a trace of the missing gems. The servant was incarcerated, upon suspicion, and whilst in prison had committed suicide by dashing his head against the jail wall.

There had been found a communication, an ante-mortem statement left by the man, that he could stand all else but disgrace, and in his last hour of life he vehemently asserted his innocence in writing. The associates of this man had been watched, and still no trace of the missing property discovered. It was a perplexing case, and the reputation of my friend, the detective, depended upon the solution.

I queried him regarding the possibility of any other of the servants being at fault. No. They had also been under surveillance.

Could the woman have robbed herself, as is sometimes conveniently done when one is short of funds? No. That would leastways lead to a pawn shop, and all the loan offices had been investigated. The fact of the business, was that those stones had disappeared so completely that they had not left even a ring of blue smoke, and the question that confronted us, was, where, and how?

I was nonplussed. I went industriously into the family history, the husband was wealthy, there was no apparent reasons why either he or his wife should act in a suspicious manner.

Upon my suggestion each and every member of the household was shadowed for several weeks and nothing suspicious developed. It is without a doubt, that the solution of the mystery would never have occurred but for one little circumstance which I will now relate.

It was perhaps a month later that a Veterinary Surgeon, who was a good friend of mine called at my office, bearing in his arms a small dog. He begged pardon for his presumptuousness, but explained that he thought that he could presume upon our friendship, to such an extent, that I would make an examination of the canine, by aid of the Roentgen ray, and see if I could give him an idea of the cause of intestinal obstruction that existed in the dog. I told him that while I did not profess to skill in his line of business, I saw no reason why the ray should not be of benefit to beast as well as to mankind, and after connecting up the tube, I started the motor, turned out the lights in the room, and in a few moments the apple green color of the tube, told me that everything was in readiness for the test.

He held the dog within the focus of the rays, and I applied the fluoroscope to my eyes. A confused mass appeared in the interior of the animal, and upon changing the position of the dog, I saw the outline of a chain, possibly containing stones, mounted in metal of some kind.

The mind acts quickly in such cases. I hurried to the telephone and called up the police station. My friend Mr. Olden happened to be in, and I requested him to call at my office at once.

Whilst waiting for Olden I subjected the animal to a more accurate localization of the mass within its bowels. It is impossible to accurately localize an object seen, unless the distortion of the rays is corrected by means of the fluorometer. By correcting the rays from four distinct places, the accurate localization is unquestionable.

I was not certain that the mass was within the stomach of the canine, so I requested Dr. Albert to hold the animal quiet, whilst I applied the fluorometer, and adjusted the sights. Having set the tiny metal wings front and back it was plain to be seen that the foreign body was correctly located from front to back, and by changing the position of my tube without changing the position of the subject and repeating the procedure, with the rays penetrating from the side, I laid my second two points of correction, and I knew that a knife thrust in a direct line from point to point of correction must surely pass through the foreign body.

I queried the veterinarian as to whom the animal belonged. "To Mrs. A.," was the response, and I knew by intuition that the missing string of diamonds were brought to light by means of the wonderful Roentgen ray. It is to be remembered that diamonds are transparent to x-rays, and are not any more shadowed than that much charcoal, or

bits of wood. The gold mounting and chain, however, being wholly capable of absorbing rays, the mass was seen in black relief, in contrast to the translucent flesh.

Olden arrived, breathless, in a short time, and he in turn viewed the phenomenon.

Operation upon the canine was out of the question, and at the suggestion of Doctor Albert, a lethal dose of morphia was administered to the animal. In ten minutes the gems were in our hands. In the interim we had explained the case to the Doctor, and he coincided with our views, that the wisest course to pursue, was strict silence regarding the place in which we found the diamonds.

Next morning, Mrs. A. was made happy by the restoration of her diamond necklace, which she still wears, not knowing that they reposed for some time in the intestinal canal of her favorite poodle.

Olden received a handsome reward, which he concientiously divided with Doctor Albert, and I had the satisfaction of knowing from practical experience, one more use of the Roentgen ray."

Having finished his story, Doctor Barsto lighted his cigar, leaned far back in his chair, and blew rings of smoke towards the ceiling.

I thanked him for his entertaining narrative, and prepared to leave. "Come again," said he, "and I will tell you of some other cases, criminal and otherwise, in which my machine has figured."

SPRINGFIELD, ILL.

By reading the AMERICAN X-RAY JOURNAL you acquaint yourself with the correct methods of x-ray therapy.

A recent meeting of the Harvard Medical Society of New York City, Dr. W. J. Morten read a paper on the treatment of malignant growths by the x-rays, with a provisional report on cases under treatment.

Notes on X-Light and Radio-Active Substances in Therapeutics.

William Rollin has made experiments with radio-active substances in the hope of finding a substitute for x-light. He found that some of the radiations retained their activity after passing through animal tissues as thick as the body of a guinea-pig. He is anxious to have radium tried on lupus, superficial cancer, and diseases of the skin in which x-light has been found useful. Radio-active substances can be used in sealed capsules held against the body by adhesive plaster, or they can be made to cover large areas by mixing them with rubber or celluloid to form moisture-proof plasters. These plasters may be still further protected by being coated on the side nearest the body by aluminum foil, and on the opposite sides by lead foil. They could be kept in stock by the yard by druggists and given to patients by prescription with proper directions as to the length of application. They could be worn at night. They could be used by the poor at much less expense than sittings for the use of x-light from a vacuum tube.

We are glad to print this little reference abstracted from the *New York Medical Record* because it really does have some significance. Becquerell carried a piece of radio-active substance in his pocket for several days and found a dermatitis developing at the point the substance was nearest the skin.

It is more difficult to unlearn false teachings than to acquire original truth. Begin right and read the AMERICAN X-RAY JOURNAL.

How can one hope to be informed unless he reads and thinks. Every reader of the AMERICAN X RAY JOURNAL is informed.

Radiotherapy of the Prostate.

BY DR. HEBER ROBERTS.

I desire to call the readers attention to a method that is wholly new in literature—a mode of treatment for the restoration of diseased and hypertrophied prostates.

It is not known that the method to be mentioned has ever been used by others. I was persuaded to use the x-rays for the relief of pain in a patient that had long been a sufferer with a tender and hypertrophied prostate. The relief afforded encouraged me to use radiations in other similar cases. The first intimation however that this form of light would render relief came through a case of Dr. Logan's. The patient was being treated for extravasation in the corpora cavernosa and corpus spongiosum rendering the entire organ useless except as a channel for carrying away the contents of the bladder. At every effort to erection, deep, not painful dorsal incurvature attended. As an organ of pleasure it was an abomination. Time and alternative medication and local application gave no relief. There was no history to account for the trouble. The injury was of six months standing and futile efforts for relief urged the doctor to advise about the x-rays. The patient had suffered for some years periodically with prostatic disease. Since the later trouble, however, he had directed all his attention to the virile organ. I was consulted and by agreement we exposed the patient daily for the relief of the extravasation. About six exposures were made when the patient spoke of the relief the rays afforded the prostate. It must not be understood that the prostate resumed its normal size under this treatment. But after the treatment was discontinued

the bulk of the unnatural prostate seemed to continuously lessen.

The method I have pursued for the treatment of these cases is to place the patient upon a chair having a wooden seat with a plane even surface throughout. In the middle of the seat there is an opening about one inch across, slightly greater laterally. Over the entire seat is fitted a sheet of lead with a fenestral equal to the size just mentioned. Surrounding the chair a curtain of lead is permitted to drop to near the floor. Eight inches beneath the seat the tube is suspended having its support in insulated thimbles resting in the curtains. The anode is directed towards the opening. The coil or static machine may be used as in all other therapy of the x-rays. The patient is seated with the perineum over the centre of the opening the widest portion being lateral to the patient. The bulb of the urethra should not be within the range of the radiation. About one inch from the junction of the scrotum with the perineum is the situation of the bulb. At this point the anterior edge of the opening in the seat should be placed. The patient sitting firmly upon the opening the perineum drops into it slightly, and if the body is somewhat inclined forward the prostate is immediately over the anode. The energy of the tube should be sufficient to give radiance through the prostate. If the carpus can be seen at a distance of four feet from the tube, radiation will be sufficient. This can be tested before the patient takes his seat. The current should pass through the tube without any apparent difficulty and therefore such a tube is a soft one. This is a relative term however. The source of electrical energy whether from coil or from plates very much determines the nature of the tubes capacity. When familiar with the apparatus and tube, without fluoroscopic test we can fairly accurately

judge of what the tube is doing in any particular case. With the coil having a rheostat with fifteen to twenty buttons the condition of the tube is determined quite accurately. The same can be done with a rheostat controlling the static machine and with the interrupters, fairly well regulate the tube. With the coil the degree of light can be regulated with almost the precision of a wick in an oil lamp. The position of the patient is important but it is not necessary to use any protecting batting between the sheet of lead and the skin. This was a former notion, and may have been a good thing when there was a great deal of wasted energy about the tube.

The third patient I treated was 70 years of age. The third lobe of the prostate was the only portion of the gland affected, so far as diagnosis could be made. On account of difficult micturition he consulted me. The prostatic urethra was considerably lengthened. It was with considerable difficulty that a metal catheter could be introduced. He suffered with some pain and perineal uneasiness. I placed the patient in the radio-postatic position and gave him daily treatments of 15 minutes each for 20 days. The soreness and perineal uneasiness was not noticeable after the first treatment. Micturition became less troublesome after each treatment, and, after the twentieth he was apparently well.

The next case I had was 55 years of age. The prostate gland was hypertrophied and would probably weigh 15 drachms or more. There was no trouble in urinating but if the bowels were at all constipated he suffered in the perineal region. He was not impotent but had precipitate semen. An anxious countenance foretold that he was worried. The radio-postatic position was directed and raying done for 15 minutes alternating days till 40 treatments were given. The

patient apparently recovered. In all cases treated marked relief followed. It is too soon to know with what permanency these treatments will relieve the patient for this common and distressing affection. Roentgen-therapy is several years old already. I have been doing this work since its inception, and find suggestions every day for improving technique in x-ray work.

In tumors, especially of cancerous type the rays act with wonderful results. Tumors judged to be cancerous imbedded beneath the tissues yield to radiations. The prostate gland differs from cancerous structure. Hypertrophy is due to increased natural fibrous and muscular tissue of the organ together with the glandular structure. However the rays are not confined to one line of influence. It must be remembered that the most potent action for good is its revitalizing action, as is known to occur on scar tissue. Its antiphlogistic action is seen when psoriasis spots fade away. The two actions here mentioned might be enough to account for its benign influence on hypertrophied prostates. But we must know that the rays have bactericidal action and also an inflammatory action. May at least the first of these not be well influenced towards good in hypertrophy of the prostate. The analgesic action is the fifth well defined action of the x-rays on human tissue. This last action accounts for the immediate relief experienced by those suffering with painful prostates. As to just how nature act to remove hypertrophied conditions is conjectural and speculative. At present we are content with the known remedy.

In my teachings I find it is better for the doctor to know better how to relieve suffering than to understand the physics of his machine.

There has been probably no time in the history of civilized races when the

prostate gland was not known to a very large number of persons. It has been written that an organ is only known by its owner when diseased. In health we have no thought of the presence of an organ. When perversion of normal functions ensues, we are reminded of something going wrong. Our mode of living and the ever tendencies of man to excess in natural and unnatural ways, invited particularly in crowded districts where show and venery is encouraged, it can only be expected, and is perfectly natural, when we consider nervous and emotional dependencies, that the prostate should be hypertrophied or otherwise diseased. Following the laws that maintain other organs, exercise in moderation maintains normalcy: excessive use leads on to changed conditions.

The prostate gland is a venereal organ. The plexus of veins about the base of the gland receive the dorsal vein of the penis; the arteries are from the internal pudic, and they go on to form the capillaries of the trabeculae. The nerves are from the prostatic plexus, and besides supplying the prostate they are distributed to the vesiculae seminalis, and the erectile structure of the organ. The common seminal ducts perforate the prostate and terminate in the prostatic urethra where the twelve ejaculatory ducts of the prostate open. The secretion of the gland makes up by far the greater portion of the ejaculatory mass at the time of the orgasm. The secretion of the prostate like the testis, continues while the receptacles and ducts are empty. Disease of the prostate materially affects this.

The precision of the normal functions of this gland acting in harmony with the promptings of other venereal organs, assures to the owner immunity from knowledge of its presence. But this organ is subjected to many artificial and unnatural abuses. Its lower border is

within one and a half to two inches from the anus, and in a normal condition weighs but four drachms, but in disease may enlarge to a weight of ninety drachms. In most instances it completely surrounds the urethra at the neck of the bladder. The three divisions of the gland, which are almost always present, lie between the urethra and the rectum. No tissue of any moment protects the prostate from the urethra and bowel. The recto-vesical pouch is four inches above the anus, and unless the gland is greatly enlarged it is in no way concerned with this fold of peritoneum. In all conditions of a distended rectum the prostate is pressed and encroached upon. The folds of mucous membrane in the rectum are subjected to thickening and ulceration. Such disturbance alters the physiological function of the prostate. Piles, strictures of the bowel and fistulae are likewise contributory causes. Fissure of the anus and diseased or irritable rectal pouches are disturbing elements. Constipation with impacted feces encourage the formation of a reservoir of the rectum and therefore pressure is made upon the gland. These are a few of the diseases of the rectum that materially have some bearing on the etiology of diseased prostates, and which were practically unknown to the primeval races. Very few of us reach fifty years of age without some acquaintance with the rectum introduced to our senses by some form of disease.

The urethra is an organ of much unnatural interference. Stricture of the urethra narrows the channel and burdens the bladder in greater contraction to expel its contents. This strain has its effect upon the neck of the bladder, distending it and encroaching upon the prostate. Every effort at micturating has its malign influence here. Gonorrhea is a potent factor, especially when the prostatic urethra is involved. Repeated uses

of the sound disturbs the prostate. Venery, greatly over-indulged in, is the great parent of pathological prostates. It is in the prostatic urethra that we find the primary cause of many cases of impotency. The nerves that come down and preside over the ducts of the seminal receptacles and prostate are ever prone to abuse. A diseased prostate, by mechanical interference against the nerves of this region may keep up a constant irritation. Due to this, an increased flow of blood is encouraged, and congestion ensuing to all the adjacent organs, the prostate is in turn the greatest sufferer.

Strictures of the urethra and other diseases of the urinary tract, together with the affections of the rectum, should be cleared away with the least possible disturbance. I mean by disturbance, that the knife should be used with the greatest possible caution in the cure of these troubles. Relief should be prompt as possible, but the knife is not the only recourse. Now, after all else is satisfactorily done, the prostate deserves the undivided attention. But most often when these contributing troubles are all cleared up, there yet remains a troubled prostate. The patient complains of throbbing, especially at night, heat, pulsating, weight, muscular movements, nervous uneasiness, fullness, fatigue, a mental unrest. There may be an over-stimulation of the procreative organs, or a diminution, or even a complete abolition of the sexual desires. The desires may remain and the power for erection be gone. There may be feeble erections and precipitate semen. All of these may be the direct result of an over-distended prostate. What shall we do with this hypertrophy? It has been the study of the ages. Old age does not necessarily mean an enlarged gland. Persons continent through the earlier periods of life, and those having escaped the popular

diseases, go into the eighties without any hypertrophy whatever. Much has been said upon this subject of natural hypertrophy in old age. But I am sure that obedience to natural laws leads man up and onward without calling for remission in any particular, of any organ. So natural are the dispensations that the ideal is sometimes seen. The body as a whole moves in unison with its parts. It is physiological for an organ to slowly surrender, if done, in harmony with the ebb and flow of Nature's laws. Its lapsing functions should cause no physical jar nor mental disquietude.

Treatment of hypertrophy of the prostate gland is far from being satisfactorily done. Medicine has utterly failed, whether used internally, locally or hyperdermatically. Electricity has always offered the greatest hope. Surgery with the knife alone, is not a success. Six modes of operation are practiced with the electric current: First: The galvano-cautery sound, which is introduced to the prostatic urethra must cauterize the tissue in situ, and by one or two successive breaks, and in two or more places. The tissues are seared, but the patient scarcely, if at all, feels pain. So little local disturbance is elicited that there is no after effect appreciable. The treatment must be repeated a few times after a few weeks of intervening rest. Second: Bottini's rapid method at one seance. In this operation the cautery is thrust through the offending portion of the prostate and direct into the bladder. Third: Combination of suprapubic cystotomy and galvano-cautery has reached its perfection in the surgical skill of Belfield and Hunter McGuire. The operation simply consists in removing the gland in situ by galvano-cautery through the superpubic opening. Fourth: Electrolysis with weak currents. Fifth: Electrolysis by strong currents, by which 15 milla, and sometimes 70m., may be

used. Encouraging reports are reported by Massey. The active pole, which is the negative one, is placed over the prostate in the urethra, while the indifferent pole is placed in the perineum. This treatment is done twice a week, while daily application of the negative pole to the prostate through the rectum is done with the positive pole over the abdomen. The treatment is complicated by using the faradic current immediately following the galvanic application through the urethra. Zinc or tin electrodes are used. Sixth: Galvano-puncture consists in plunging a platinum needle into the body of the prostate, the positive electrode placed over the abdomen to complete the circuit.

301 CHEMICAL BUILDING.

Origin of Cancer.

This was the subject of a communication sent to the Chelsea Clinical Society, March 25, by Dr. J. G. Adami of Montreal. We desire to record the points herein made, because they are in accord with the best informed persons upon this subject. It is especially useful to readers of the AMERICAN X-RAY JOURNAL, for they are doing work with the x-rays for the cure of cancer.

He said: "From a study of the syncytioma malignum, it might be legitimately deduced that there existed one form of tumor of highly malignant type, in which the infiltrating cells were not those of the organism itself, but were derived from another organism. The infiltrative and invasive properties of these cells were not a new acquirement, but were an exaltation of properties normally possessed by them, or, more exactly, under normal conditions it was observed that there was an interaction of two forces—one the invasive properties of these cells, and the other the protective properties of the surrounding maternal tissues, by which interaction the extent of invasion of the cells was strictly limited to the placental side. Dr. Adami's view was that the development of the syncytioma malignum must therefore be at-

tributed to either an increase in the invasive properties of the syncytial cells or to a lessened resistance on the part of the maternal tissues, or a combination of the two. It was concluded, therefore, that if microparasites played any part in the production of the tumor that it must be either by exalting the infiltrative powers of the one, or by lowering the resistant powers of the other. Dr. Adami pointed out that proof positive of the existence of such specific microparasites was still wanting, and in its absence he found it difficult to conceive how specific microparasites could bring about those results.

The prevalent conception of cancer parasites, as existing within the cancer cells, involved the idea of malignant growths being the product of parasites acting within parasites, because, as shown by the study of syncytioma malignum, the tumor cells themselves were essentially parasitic in the organism.

In short, according to Dr. Adami, if the present popular idea was traced to its legitimate conclusion, the most that could be said for it was as the association of parasitic ideas might already have occurred to some, that the theory was in harmony with the great generalization of the poet who wrote that

Great fleas have little fleas upon their backs to bite them;
And little fleas have lesser fleas, and so on ad infinitum.

Dr. Adami wished to know if that generalization was also to be applied to explain the action of pathogenic bacteria. In the long-continued action of microparasites he was willing to recognize a process which might, like other modes of stimulation, initiate aberrant and neoplastic cell growth, but beyond that point he contended that they seemed to be asked to contemplate a most extraordinary condition of affairs.

The parasitic theory of the origin of cancer presents to many earnest and keen investigators so large a number of difficulties that, before being accepted as the true cause, a quantity of unsolved points must be made clear.

The progress towards this end has, of late, been by no means rapid.

The increase, however, in the facilities for cancer research in various countries of the world gives rise to the hope that the final unraveling of its mysteries may not be far distant.

History of a Case of Unrecognized Fracture of the Radius.

BY PAUL F. FLETCHER, late A. A.
Surgeon U. S. Army.

On March 12th of the present year, a young lady consulted me regarding peculiar, fugitive pains of the left arm and forearm. On questioning, the following history was elicited: Ten years ago, while riding on a sled, she was thrown to the ground, and in attempting to protect her body, injured her left wrist. The family physician was immediately summoned, and after an examination, declared the injury a sprain. He applied a dressing, placed the member in a sling and at the end of three weeks discharged the patient.

Soon after the removal of the dressing, the young woman experienced ill-defined, fugitive, yet persistent pain in the radial side of the fore-arm and hand, also at the posterior aspect of the humerus near the musculo-spiral groove.

The physician who had attended her before was again called, and after an examination, pronounced the condition one of partial paralysis, due to some affection of the radial nerve. At this time the patient observed great difficulty in manipulating the hand, and frequently dropped articles after grasping them.

The surgeon in attendance applied a plaster cast which was maintained for a long period—just how long I do not know—and during the time it remained in position, no pain was suffered. On the removal of the cast, pain and discomfort returned, and another surgeon was consulted. He advanced a diagnosis of synovitis of the wrist point, and placed a cast on the painful forearm and hand. The same relief of pain was noted, and when the cast was removed, it returned with the same degree of intensity.

At this time some one recommended that she consult the osteopaths at Kirksville. This was done, and a diagnosis of curvature of the spine in the region of the seventh cervical vertebra, was made. Osteopathic measures were followed for a short time, and then becoming discouraged, the patient abandoned this treatment and

consulted me. I was as unsuccessful in reaching a diagnosis as my colleagues, but favored a diagnosis of synovitis. A cast was again applied, temporarily, and the patient advised to submit herself to the x-ray. This was consented to, a radiograph made, and lo! a fracture site with a resultant spur of bone was discovered at the external and posterior aspect of the radius, five centimeters from the apex of the styloid process.

Operation was counseled and yielded to. Patient was taken to a hospital, and an incision made near the posterior surface of the radius, and the tissues separated down to the periosteum. On reaching the deeper tendons, that of the extensor carpi radialis longior was found adherent to the osseous spur. This spur was devoid of periosteum, or osteoncus, which had penetrated the tendon sheath and substance. The inflammatory deposit was extensive and had resulted in adhesion over a considerable area. These were broken up, the radialis longior tendon released and the spur chiseled from its bed, flush with the normal line of the shaft. The periosteum was then drawn over the denuded area and sewn with fine cat-gut, and the muscular structures permitted to resume their normal positions.

The integument was sutured with silk-worm gut and a skin suture of fine carbolyzed cat-gut introduced. Union by first intention was secured.

The patient left the hospital in eight days. All pain, which before the operation was constant and occasionally of great paroxysmal intensity, has disappeared.

In performing this operation, I avoided disturbing muscular structures where possible, without exposing a much more extensive area of bone surface and interfering with the attachments of the Pronator Quadratus. I could not trace the fracture line to discover the course of the line of union. Superficially it appeared to be a Colles' fracture, yet, from the absence of much deformity, I am inclined to believe the injury to have been a greenstick fracture. (Radiograph of case on 2d page.)

ST. LOUIS, MO

"A Pictorial System of Instruction," the new and most invaluable work of Monell's, contains no part of the matter of his former works. All x-ray workers should have it.

X-Ray Prophecy.

Sometimes when you become familiar with a subject that is quite unknown to the many, it is easy to make a good guess that seems prophetic to others if it comes true. Readers of THE AMERICAN X-RAY JOURNAL will remember four years ago we predicted that no work on surgery would sell that ignored the x-rays. The prediction was treated with silent contempt. What about the works that have appeared? We predicted that successful operators and skin specialists would be compelled to use the rays or go out of business. They laughed at the suggestion. How is it? It is like a stampede now. They are all falling over each other to get there. Five years ago there were but three houses in America that made static machines, although electro-therapeutics was largely taught in special schools. Now, there are more than 25 manufacturing houses, some of whom like Van Houten & Ten Broeck, Waite & Bartlett Manufacturing Co., McIntosh Battery and Optical Co., R. W. Wagner Manufacturing Co., Electro-Therapeutic Manufacturing Company, and others that can not keep up with the demand for x-ray machines.

We made investigations of 120 medical colleges on this continent, and not one of these, two years ago taught x-ray therapy. We predict now, that within four years, not an accredited medical school in America will be without a professor of radio-therapy. Don't forget this.

Treatment of Epithelial Skin-Cancers and Sycosis Non-Parasitica with the X-Ray.

J. F. Rinchart speaks of the advantages of the treatment of these cases by the x-ray. It gives no pain, there is but little scar tissue left after the sore has healed, and there is the possibility of a more thorough eradication of the disease, as the effect of the rays is to destroy all the cancer cells within the area exposed. He reports a number of cases which illustrate the success of this

treatment. It is best not to be in too great a hurry to obtain the reaction lest too much inflammation be caused. There is a great difference in skins as to their ability to withstand the x-ray. It is best to begin with a five-minute exposure at six or eight inches and try that for a day or two, and if no reaction is obtained, increase the time of exposure till the desired effect is produced.

This abstracted matter briefly points out a procedure that is quite correct and is imitated by all good operators. In diseases that are amenable to ordinary medication they differ in different subjects and require different modes of procedure to effect a cure. In x-ray therapy this must be observed.

We are glad of the interest the better medical journals are now taking in x-ray literature.

THE AMERICAN X-RAY JOURNAL two years ago predicted that every writer of a work on surgery that failed to give ample space to the importance of the x-ray, would have practically no sale. It has proven so.

Dr. Charles Warren Allen reports 13 cases of cancer under his care, and all of these are improving. One of his patients was a physician suffering with cancer of the rectum.

Carl Beck in his paper, entitled "Differentiation between Inflammatory Processes and Neoplasms of the Bones by the Roentgen Rays," says that many limbs have been sacrificed by unnecessary amputation, and many lives lost by deferred amputation, on account of errors in differentiating the various inflammatory processes from the growths of the bones and joints.

The x-rays have opened entirely new fields in this sphere, and in many cases the Roentgen rays give positive information.

Owners of x-ray machines, who desire to be up-to-date in x-ray work should read the AMERICAN X-RAY JOURNAL. Have you subscribed? Why not?

X-Ray Divergence Chart.

SUPPLEMENT TO

A System of Instruction in X-Ray Methods and Medical Uses of Light, Hot-Air, Vibration and High Frequency Currents.

By S. H. MONELL, M. D.

Students of X-Ray work should study this chart reproduced on the front cover of this Journal.

This chart shows at a glance the following points of essential interest to the X-Ray operator:—

1. A Plane Diagram of X-light radiations from the *anode* focus-point.
2. The rate of departure of X-Rays from a parallel path at different distances from the tube.
3. The proportionate loss of right-angle shadows at different distances horizontal to the perpendicular axis.

4. The area of non-distorted field of observation at any distance from the tube.

5. The area within which a body of any thickness will shadow a right-angled relation of the parts at a given distance from the tube.

6. The distance from the tube at which a part and the photographic plate must be exposed to secure essential correctness and non-distortion for a diagnostic field of any given size.

7. The general area of approximate non-distortion on the plate.

8. The obliquity of shadows at all distances outside of the central field of exact perpendicularity of radiation.

The scale of the Chart reads down from the focus-point of the tube to an imaginary plate twenty inches distant. For greater distances, extend the indicated lines below the Chart, and apply the same rule of interpretation. For full explanatory description see Chapter XVIII.

X-Ray Narrative.

The series of articles under this heading are being written by Dr. Fred S. O'Hara of Springfield, Ill. The articles are written for the benefit of physicians operating x-ray machines. On account of inability of physicians to receive the proper instruction in this branch of the science and art, or in other words, the diagnostic and therapeutical uses of the x-rays, these articles are written. They are interesting to all readers, but doubly so to those wishing clearer understanding of radiotherapy and correct methods of irradiation. They are alluring to a tired doctor whose services in the general field of practice have worn off the nural sheath. In these articles we find the awakening of green spots in the mental domain. The plan is to take up tired nature, and while repasting on vivid ideas, consume modes and methods of doing accurate x-ray work. Like Oliver Wendell Holmes, William A. Hammond and Wier Mitchell, so Fred S. O'Hara inclines to the literary entertaining in teaching. He is a young man with a rare talent. Those who follow him will weigh more in the scale of knowledge.

Roentgen Society of America.

The regular meeting of the Roentgen Society of America will convene in Chicago, December 10th to 11th.

The local Committee are:

DR. RALPH R. CAMPBELL,
414 Marquette Building.

DR. JOHN B. MURPHY,
Reliance Building.

DR. LOUIS E. SCHMIDT,
424 North State Street.

DR. L. M. HARRIS, Chicago.

DR. W. L. BAUM, 103 State Street.

DR. H. C. ANTHONY,
465 Dearborn Avenue.

DR. W. A. PUSSY,
Columbus Medical Bld., Chicago.

An x-ray apparatus in the hands of one not able to use it properly is a cumbersome and expensive luxury. The new work of Monell's "A Pictorial System of Instruction," will teach any ordinary mind practical uses of the machine.

Dr. Reginald reports an old case of Lupus Vulgaris, which was repeatedly cut and scraped, with the local application of the usual remedies, had resulted in no improvement, until the x-ray was resorted to.

Radium.

Reference made in the following observations to diagnostic possibilities of radium in eye disease is not altogether new. It should be noted that in using radium fluorescing surfaces are not used. But the points made have no advantage over the screen under the x-rays. We examined several hundred cases of blind and partially blind persons in 1896. There is a way to determine the degree of blindness, when due to atrophy of the optic nerve, by the x-rays. These observations of ours were widely published, at the time, all over the world.

Javal makes an interesting communication to the *Gazette des Hopitax Civils et Militaires*, April 17, 1902, concerning the curious properties of the new metal, radium, discovered and studied by Mr. and Mme. Currie. In the dark this metal emits a light which is peculiar in itself, which is not phosphorescence, and which is distinct from Roentgen rays, although bearing a certain analogy to the latter. The rays from this metal traverse opaque bodies and produce physiological effects. Currie thinks that these properties could be utilized to discover if the optic nerve in the blind is absolutely atrophied, and if, accordingly, all hope should be abandoned of the recovery of sight. Javal cites several instances in which certain blind patients could perceive the glimmer of radium. In others, on the contrary, there were no perception of its light. This metal is still extremely rare. It is prepared in the form of the chloride.

Surgical Operation in the Old

is referred to in the *Radiance Medical Journal* by Dr. J. C. Sexton. The doctor contends that it's disease, not years, that makes people old. In surgical operations shock is not a great factor. The loss of blood is. It is not necessary to produce deep narcosis in old people for the extreme sensibility of the nervous system incident to the prime of life seems dulled in old age. Old people can endure a great deal of surgical infliction. The observation is worthy of thoughtful consideration.

At the meridian of life the greatest tendency occurs for the growth of cancers. For women this is the most critical period.

Scarcely is there a hospital that does not have cases under surgical care for cancer. But a lessening of this variety of cases is noted day by day. Instead of surgery the cases are being successfully treated with the x-rays. Surgery finds this fruitful field diminishing. We predict the ultimate restoration of cancerous cases without shock, by the benign system of radiotherapy.

Dr. J. Rudis-Jicinsky reports two cases of Intestinal Obstruction, diagnosed by the x-ray.

We are glad to see some of our medical friends in old St. Louis awakening to the uses of the x-rays. Some of them are being provided with useful apparatus, and we trust they will not stop short of learning how to make the best use of them.

At a recent meeting of the Vienna Society of Physicians, Dr. Schiff and Dr. Freund presented an interesting paper, on Depilation by High-Tension Electric Currents.

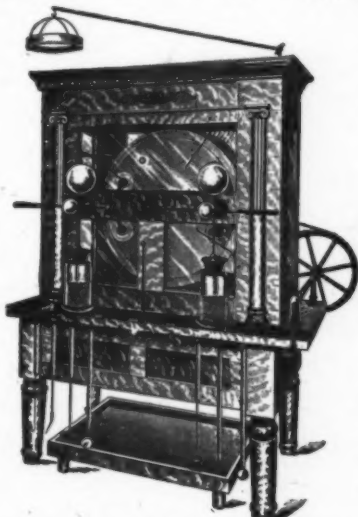
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I notice in the advertisement of the manufacturers of Mica Plate Machines that they claim that two revolving Mica Plates are equal to ten revolving glass plates in a Static Machine.

I am ready to make the test to prove to the contrary: that two Mica Plates will not give the same amount of current that ten glass plates of equal size will give.

I will meet in competition the manufacturers of the Mica Plate Machine in Chicago, or in New York City, in the presence of a body of Medical and Scientific Electricians to decide upon the merits of the machines, and will furthermore prove that a machine with two glass plates, same size as two Mica Plates, will equal and do more and better work, (x-ray or otherwise), under same conditions, than a Mica Plate Machine can do.

This advertised statement has been heretofore unchallenged, and I now give them (the manufacturers of the Mica Plate) the opportunity to prove the same and have it settled which is the most efficient in actual practice.

HENRY E. WAITE, M. D.,

President, WAITE & BARTLETT MFG. CO.,

108 East 23d Street,

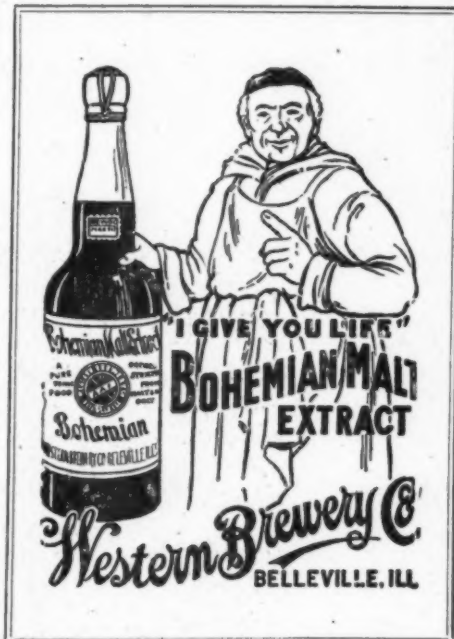
NEW YORK CITY.

FOR YOUR WELFARE!

THERE are times in the experience of almost every person when there seems to be a "letting down" on the vital forces, a weakening of the digestion and the appearance of nervous troubles more or less complicated. Professionally the physicians recognize, and almost instinctively the sufferer knows, that medicine is not so much the requirement as a tonic, which acts as a food and medicine.

It is at such a time as this that Malt Extract like "The Bohemian Malt Extract" meets its mission and accomplishes grand results. Bohemian Malt Extract contains a greater amount of nutritious matter than any other Malt Extract on the market, and proves its efficacy by the marvellous results it is accomplishing at the hands of the profession and by those who have been steadily using it as a tonic.

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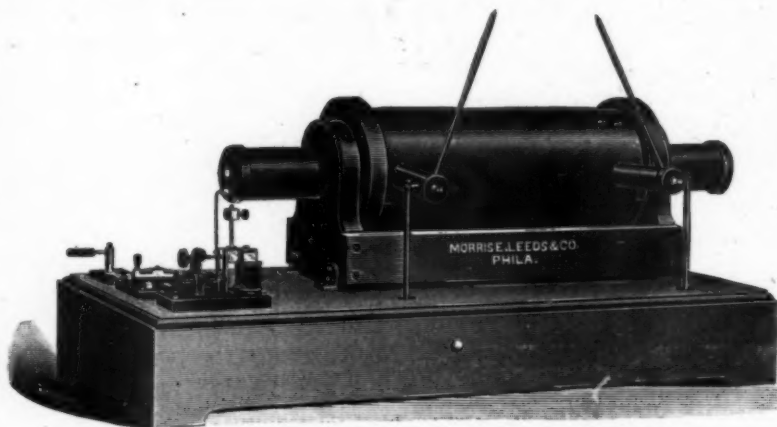
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